Date: Fri, 29 Apr 94 04:30:28 PDT
From: Ham-Space Mailing List and Newsgroup <ham-space@ucsd.edu>
Errors-To: Ham-Space-Errors@UCSD.Edu
Reply-To: Ham-Space@UCSD.Edu
Precedence: Bulk
Subject: Ham-Space Digest V94 #108
To: Ham-Space

Ham-Space Digest Fri, 29 Apr 94 Volume 94 : Issue 108

Today's Topics:

Date: 29 Apr 94 05:43:47 GMT
From: dog.ee.lbl.gov!agate!usenet.ins.cwru.edu!cleveland.Freenet.Edu!dt650@ucbvax.berkeley.edu
Subject: Ao-21 via mobile?
To: ham-space@ucsd.edu

Re AO-21 Mobile: I normally work OSCAR 21 with about 20 watts into a six element beam, but I've gotten into the satellite twice with 20 watts into a dual band whip mounted on the trunk of my car.

The first time, the bird was almost directly overhead - at least 80 degrees above the horizon. It was about 2:00 AM CDT and the downlink was completely quiet - nobody was using it at all. I gave a "what the heck" call and was startled to hear myself on the downlink. I called CQ and N7POR came back to me from Seattle. We had about a fifteen second QSO before I lost the bird. I

was parked between two minivans at the time, which may have acted like reflectors.

The second time was at 11:05 UT, to WA2GSY in N.J. AO-21 was about 60 degrees above the horizon then, to the east of my WI QTH.

I also remember talking to Joe barefoot while driving home from work one morning, but I can't find it in my log. I do remember that he had to fight to hear me and that I checked the satellite's position when I got home and it was over Michigan at the time.

An article in the AMSAT magazine last year tells how a guy has made many contacts from his mobile. I can't remember what power he was using, but I remember that he bent his whip back at an angle to help elevate his signal.

A columnist in 73 magazine made a QSO with a guy in Cleveland using an HT once, too. He said he held it over the roof of a Volkswagon to use it as a reflector.

Anyway, it _can_ be done, but it's not easy.

N9LTD

Date: Thu, 28 Apr 1994 13:19:29 GMT
From: ihnp4.ucsd.edu!library.ucla.edu!csulb.edu!csus.edu!netcom.com!marcbg@network.ucsd.edu
Subject: ARLS022 Astronauts at HamVention
To: ham-space@ucsd.edu

SB SPACE @ ARL $ARLS022
ARLS022 Astronauts at HamVention

ZCZC AS66
QST de W1AW
Space Bulletin 022 ARLS022
>From ARRL Headquarters
Newington, CT April 26, 1994
To all radio amateurs

SB SPACE ARL ARLS022
ARLS022 Astronauts at HamVention

Astronauts at HamVention

A space forum at the Dayton HamVention will feature two NASA shuttle astronaut-hams, Tony England, W0ORE, and Steve Nagel, N5RAW. The forum will commemorate 10 years of Amateur Radio aboard the shuttles.

Tony England flew on the second ham radio mission, in 1985, while Steve Nagel, a veteran of several shuttle flights, most recently commanded shuttle flight STS-55 in 1993. The two will discuss their Amateur Radio experiences from space and answer questions.

Also at the forum will be members of the ARRL SAREX Working Group, including ARRL Educational Activities Manager Rosalie White, WA1STO, and Roy Neal, K6DUE, a principal coordinator of the shuttle Amateur Radio project.

The forum is scheduled for 1 PM on Saturday, April 30, in Forum Room 5 at Hara Arena.
NNNN
--

```
 Marc Grant
 Home: marcbg@netcom.com                             Telephone: 214-205-4593
 Office: marcbg@esy.com                                  Amateur Radio N5MEI
              "The road to enlightment is chuck full o' potholes"
```

Date: Thu, 28 Apr 1994 14:01:08 GMT
From: ihnp4.ucsd.edu!galaxy.ucr.edu!library.ucla.edu!csulb.edu!csus.edu!netcom.com!marcbg@network.ucsd.edu
Subject: HR AMSAT NEWS SERVICE BULLETIN 106.04
To: ham-space@ucsd.edu

HR AMSAT NEWS SERVICE BULLETIN 106.04 FROM AMSAT HQ
SILVER SPRING, MD APRIL 16, 1994
TO ALL RADIO AMATEURS BT
BID: $ANS-106.04

Weekly OSCAR Status Reports: 16-APR-94

```
AO-13: Current Transponder Operating Schedule:
M QST *** AO-13 TRANSPONDER SCHEDULE ***  1994 Apr 07-Jul 11
Mode-B  : MA   0 to MA 170 |
Mode-BS : MA 170 to MA 218 |
Mode-S  : MA 218 to MA 220 |<- S beacon only
Mode-S  : MA 220 to MA 230 |<- S transponder; B trsp. is OFF
Mode-BS : MA 230 to MA 250 |        Blon/Blat 230/-5
Mode-B  : MA 250 to MA 256 |
```

```
Omnis   : MA 250 to MA 120 |  Move to attitude 180/0, Jul 11
[G3RUH/DB2OS/VK5AGR]

FO-20: The following is the current schedule for transponder operations:
       ANALOG MODE:
      20-Apr-94  7:35 -to- 27-Apr-94 7:55 UTC
      11-May-94  6:54 -to- 18-May-94 7:20 UTC
  Digital mode: Unless otherwise noted above.
  [Kazu Sakamoto (JJ1WTK) qga02014@niftyserve.or.jp]
```

STS-59: To obtain a QSL, either as a result of a SWL or for a QSL, send your report or QSL to ARRL EAD, STS-59 QSL, 225 Main Street, Newington, CT 06111, USA. Include the following information in your QSL or report: STS-59, date, time in UTC, frequency and mode (FM voice or packet). In addit-ion, you must also include an SASE (or sufficient IRCs) using a large, business-sized envelope if you wish to receive a card. The Orange Park Amateur Radio Club in Florida has generously volunteered to manage the cards for this mission. [Bob Inderbitzen (NQ1R) Assistant to the Manager, ARRL Educational Activities]

KO-23: Working well and has a new pair of images. [WH6I]

KO-25: Working well. A number of new images can be found on KO-25 but since the wide angle images are in a new format that so far has not been decoded, and since narrow angle images are very hard to locate in the absence of the companion wide angle image there is very little to get out of the images that are available. [WH6I]

AO-16: Working well. WH6I notes that usage on the 1200 baud OSCARS has has dropped off considerably. [WH6I]

LO-19: Working well. [WH6I]

The AMSAT NEWS Service (ANS) is looking for volunteers to contribute weekly OSCAR status reports. If you have a favorite OSCAR which you work on a regular basis and would like to contribute to this bulletin, please send your observations to WD0HHU at his CompuServe address of 70524,2272, on INTERNET at wd0hhu@amsat.org, or to his local packet BBS in the Denver, CO area, WD0HHU @ W0LJF.#NECO.CO.USA.NOAM. Also, if you find that the current set of orbital elements are not generating the correct AOS/LOS times at your QTH, PLEASE INCLUDE THAT INFORMATION AS WELL. The information you provide will be of value to all OSCAR enthusiasts.


```
--
 Marc Grant
 Home: marcbg@netcom.com                             Telephone: 214-205-4593
 Office: marcbg@esy.com                                  Amateur Radio N5MEI
              "The road to enlightment is chuck full o' potholes"
```

Date: 28 Apr 1994 20:49:52 GMT
From: ihnp4.ucsd.edu!swrinde!gatech!mailer.acns.fsu.edu!usenet.ufl.edu!astro.ufl.edu!garcia@network.ucsd.edu
Subject: Jupiter Radio Observations
To: ham-space@ucsd.edu

A postscript version of this file jupradio.ps, as well as the figure, hist.ps, mentioned in the text is available via anonymous ftp to astro.ufl.edu in the /pub/jupiter directory.

****

THE JOVIAN DECAMETRIC EMISSION AND THE COLLISION OF COMET SHOEMAKER-LEVY 1993e.

The Jovian Decametric Emission.

The Jovian decametric emission was discovered in 1955 by B.F. Burke and K.L. Franklin at the frequency of 22.2 MHz. The emission has an upper cutoff frequency of 39.5 MHz. It can be detected from ground based stations from the upper cutoff frequency of the emission down to the cutoff frequency of the terrestrial ionosphere which is usually around 5 to 10 MHz. The peak of the intensity of the emission occurs at around 8 MHz. The emission occur in episodes called "storms". A storm can last from a few minutes to several hours. Two distinctive types of bursts can be received during a storm. The L bursts (L for Long) are bursts that vary slowly in intensity with time. They last from a few seconds to several tens of seconds and have instantaneous bandwidth of a few MHz. The S bursts (S for Short) are very short in duration, have instantaneous bandwidth of a few kHz to a few tens of kHz, and drift downward in frequency at a rate of typically -20 MHz/sec. They arrive at a rate of a few to several hundred bursts per second. In a 5 kHz bandwidth receiver they last only a few milliseconds. Sometimes both types of bursts can be heard simultaneously. The emission is believed to be beamed into a thin hollow cone with axis parallel to the direction of the magnetic field lines in the region where the emission originates (near the magnetic poles). The probabilities of detecting the emission depend strongly on the values of the Jovian central meridian longitude (CML), the Io Phase, and the Jovicentric declination of the Earth (DE). The CML is the value of the System III longitude of Jupiter facing the Earth. The Io Phase is the angle of Io, one of Jupiter's moons, with respect to superior geocentric conjunction. The regions in the CML-Io phase plane that have increased probabilities of emission are called sources. The sources are named Io-A, Io-B, and Io-C for the Io-

controlled emission and A, B, and C for the Non-Io controlled emission.

Source	CML	Io Phase	Characteristics of emission
Io-related sources			
Io-A	200-290	195-265	RH polarized, mostly L bursts
Io-B	90-200	75-105	RH polarized, mostly S bursts
Io-C	290-10	225-250	LH polarized, L and S bursts
Non-Io related sources			
A	200-290		
B	90-200		
C	290-10		

The Collision of Comet Shoemaker-Levy 1993e and the Possible Effects on the Low Frequency Radio Emission.

Comet Shoemaker-Levy 1993e will impact Jupiter between July 16 and 22, 1994. Extreme tidal forces exerted by Jupiter broke the nucleus up into at least 21 fragments during a close pass by the planet about two years ago. The largest of the fragments are about 2 to 4 km in diameter. Over a period of about six days, each fragment will penetrate Jupiter's magnetosphere and explode at about the cloud-top level of the atmosphere, creating a fireball that may rise to the altitude of Jupiter's ionosphere. Since the fireballs will occur just beyond Jupiter's limb as viewed from the Earth, they will not be visible unless they rise to unexpectedly great heights.

It is not known whether the passage of the fragments through the magnetosphere and their collision with Jupiter will create radio emissions that are detectable from Earth. An electric field will be induced in the nuclei as they pass through the Jovian magnetic field, an effect similar in nature to that experienced by the satellite Io. However the plasma density around the comet and the magnitude of the electric field induced may be too low and cause only weak radio emission (unless something unexpected happens that could suddenly increase the amount of ionized gas around the comet). Several suggestions has been made regarding the possibility of emission at different stages of the passage and entry into the jovian ionosphere and atmosphere. One suggestion is that the interaction of the fragments with the Jovian ionosphere may trigger decametric emission in the last 10-20 seconds before the explosion. Another suggestion is that low frequency electromagnetic radiation could be emitted by the plasma released during the fireball. In this case the emission may be in the form of short pulses of electromagnetic radiation. Another possibility is the stimulation of lighting discharges

from lower altitudes after the fireballs have developed. This emission may be in the form of almost continuous noise originating in the possible large number of lightings discharges. Since the fireball will occur on the far side of the planet it is unlikely that direct radio emission could be detected from ground based observations. There have been suggestions that ducting of the radio emission in the layered ionosphere around the limb of the planet might make possible its detection from Earth. Apparently no estimates for the intensity of these types of emission are yet available.

Still one more possibility is that plasma released by the comet and plasma generated by the fireball may affect the well known decametric emission. If this plasma diffuses along lines of magnetic field and reaches the region where the decametric emission is generated, it may alter the probabilities of emission or it may have a quenching effect of the emission in particular at the low frequencies. These changes in the behavior of the decametric emission may not be easily detectable, at least for an occasional observer. It will be necessary to make systematic observation of the emission for several months prior to the collision in order to establish a baseline for the probabilities, the intensity, bandwidth, etc. of the emission. As was mentioned above, the decametric emission is sporadic but the probabilities of receiving the emission are larger for some particular configurations of central meridian longitude (CML) and Io phase. Careful radio observations will be made from various locations in an attempt to ascertain which of these situations prevail during the impacts. Whatever information can be determined in this way will be of great value in the investigation of the origins of Jupiter's radio emissions.

The University of Florida Radio Observatory (UFRO) has been observing the Jovian decametric emission since 1957. For the present apparition the UFRO started observing in January, 1994 at several frequencies between 18 to 32 MHz. The observations will be extended through at least August to be able to observe during the collision of comet Shoemaker-Levy 9 with Jupiter.

Observing the Jovian Decametric Emission.

There have been reports of detection of the Jovian decametric emission with simple half wavelength dipole antennas or low gain antennas such as the long-wire type or loop antennas. Such low gain antennas may allow the detection of only very strong bursts. Antennas with gains of 6-10 dB with respect to a half wavelength dipole are more suitable for detecting the emission. Yagi (5-elements) and log periodic antennas usually have gains in this range. These higher gain antennas connected to HF amateur radio receivers can easily detect most of the strong part of the Jovian

decametric radio emission. It will be necessary for good reception of Jupiter that the antenna points towards the planet. This may be difficult since most amateur antennas only have azimuthal control. Most amateur HF radio receivers are suitable for detecting the emission since they have a relatively narrow passband and adequate noise figure. The relative narrow band of these receivers will help in tuning away from radio stations. It will be necessary to disable the AGC of the receiver otherwise the signal will be badly compressed. An observing frequency between 18-22 MHz is recommended. At frequencies below 18 MHz strong interference from stations and static is expected. At frequencies higher than 22 MHz, the probabilities of detecting the emission drop sharply because of the drop in intensity of the emission (see attached histogram of occurrence probability). Although the low solar activity expected for this year is a favorable condition for detecting the emission during the period of the collision, the low value of DE (around -3.4 degrees for July, 1994) reduces the probabilities of detection.

As a reference, the minimum detectable flux density (power per unit area per unit bandwidth) expected for an 8 dB gain linearly polarized antenna connected to a receiver having a 5 kHz bandwidth and an output time constant of 1 second is of the order of 5X10^-22 wm^-2Hz^-1 at a frequency of 18 MHz. Jovian decametric radio emission with peak flux densities in the range of 10-100X10^-22 wm^-2Hz^-1 are common. Expressing the flux density in Jansky (Jy), a unit more commonly used in radio astronomy, these peak flux densities are 100,000 to 1,000,000 Jy (1 Jy= 1X10^-26 wm^-2Hz^-1). In terms of power and voltage at the input of a receiver,10x10^-22 wm^-2Hz^-1 is equivalent to a power of 1x10-9 microwatt or 0.23 microvolt over 50 Ohms.

A few more additions need to be considered if the information gathered is to used for scientific purposes. A source of calibrated noise is necessary in order to calibrate the intensity of the signal. As an example, an HP 461A amplifier can be used as a noise source (with a variable attenuator), but the noise temperature of the amplifier must be calibrated against a standard noise source such as the type 5722 current-saturated noise diodes. Timing information is also an important consideration. WWV timing signals can provide adequate timing information. The ability to identify the Jovian emission and separate it from stations, static, or other types of interference is also important. Recording of the receiver output in paper chart records provide a nice way of monitoring the emission. The chart records can be used for further data reduction and analysis, but their use is sometimes time consuming. A personal computer with an A/D converter will provide a better way to store, retrieve, and process the information (if further data reduction and analysis are to be made). Time constants of about 1

second are adequate for recording the envelope of the emission. Shorter time constants (10-20 milliseconds or shorter) are necessary to resolve the faster S bursts.

The University of Florida Radio Observatory (UFRO) has generated a listing of the prediction of the configurations of CML, Io Phase, the active sources, and the probabilities of emission at 26.3 MHz for the months of April, May, June, July, and August, 1994. The probabilities at 26.3 MHz are valid for an antenna of large collecting area (These probabilities were obtained with the 640 dipoles of the UFRO 26.3 MHz Large Array), and are included as reference only. Probabilities at 18 MHz and other frequencies (obtained with Yagi antennas with gains around 8 dB) may be added later. For those having access to Internet, the files containing a short explanation and the predictions are accessible at the ftp site astro.ufl.edu; the files are in the pub/jupiter directory and are called README.DOC and april94.txt, may94.txt, june94.txt, july94.txt, and aug94.txt. Questions or comments regarding the predictions can be sent to L. Garcia at garcia@astro.ufl.edu.

Francisco Reyes
E-Mail:reyes@astro.ufl.edu
Phone:(904) 392-7749

Leonard Garcia
E-Mail:garcia@astro.ufl.edu
Phone:(904) 392-0668

Dept. of Astronomy. P.O. Box 112055
University of Florida
Gainesville, FL 32611-2055
Fax (904) 392-5089
03/27/94

--

```
*************************************************************************
* Leonard N. Garcia             *  garcia@astro.ufl.edu               *
* Astronomy Department         *                       *
* University of Florida        *                       *
* P.O. Box 112055          *                       *
* Gainesville, FL 32611-2055     *                       *
*************************************************************************
```

Date: 28 Apr 1994 21:05:21 GMT
From: ihnp4.ucsd.edu!usc!sol.ctr.columbia.edu!news.cs.columbia.edu!
news.columbia.edu!bonjour.cc.columbia.edu!mac20@network.ucsd.edu
Subject: SAREX and Baycom ?
To: ham-space@ucsd.edu

I have not had much luck (read; any) trying to connect to a number of different shuttle missions in the last year or more.
we have a decent satelite antenna tower and 25 watts out and i'm wondering if i'm doing anything systematically wrong.

- Our "all-mode" 2 meter only allows 5 KHz step increments, this isn't fatal is it?

- What parameters are recommended for Baycom? is this anything different then a full TNC? how frequently should you send out your packets in this duplex situation?

- Anyone know of any partiuclarly useful incantations i should be reciting?

Fortitude is a better term then banging your head against the wall.

Mike Cecere   KF2NV
Applied Physics Department
Columbia University

Date: Fri, 29 Apr 1994 07:34:53 GMT
From: ihnp4.ucsd.edu!dog.ee.lbl.gov!agate!howland.reston.ans.net!EU.net!sunic!
news.funet.fi!ousrvr.oulu.fi!so-patu@network.ucsd.edu
Subject: SAREX and Baycom ?
To: ham-space@ucsd.edu

I had similar problems...i think the reason is that the baycom software cannot understand the "UA,S" -packet sent by shuttle.

I didnt try GP+TFPCX, because it doesnt decode noisy signal as well as baycom does, instead i tried working with normal TNC-
no problems...

Timo

Timo Patana   Phone : +358-81-344947
OH6NVG   Mobile :   940-4968276

Date: Thu, 28 Apr 1994 16:46:33 GMT
From: ihnp4.ucsd.edu!library.ucla.edu!csulb.edu!csus.edu!netcom.com!netcomsv!telesoft!garym@network.ucsd.edu
Subject: STS-65 Element Set (94189.762)
To: ham-space@ucsd.edu

```
STS-65
1 00065U          94189.76284929  .00052344  00000-0  15762-3 0    37
2 00065  28.4664  13.0731 0003571 330.7493  29.2906 15.90324781    23

Satellite: STS-65
Catalog number: 00065
Epoch time:      94189.76284929   =    (08 JUL 94   18:18:30.18 UTC)
Element set:     003
Inclination:       28.4664 deg
RA of node:        13.0731 deg          Space Shuttle Flight STS-65
Eccentricity:     .0003571             Prelaunch Element set JSC-003
Arg of perigee:   330.7493 deg         Launch:  08 JUL 94  17:06 UTC
Mean anomaly:      29.2906 deg
Mean motion:   15.90324781 rev/day          Gil Carman, WA5NOM
Decay rate:     5.2344e-04 rev/day^2      NASA Johnson Space Center
Epoch rev:               2
```

(for Shuttle Elements subscription info, email: listserv@alsys.com)

--

Gary Morris   Internet: elements-request@alsys.com
KK6YB   Packet: KK6YB @ N0ARY.#NOCAL.CA.USA.NA
San Diego, CA, USA   Phone: +1 619-457-2700 x128
--
Gary Morris   Internet: garym@alsys.com (garym@cts.com)
Alsys Inc.   Packet: KK6YB @ N0ARY.#NOCAL.CA.USA.NA
San Diego, CA, USA   Phone: +1 619-457-2700 x128 (voice/fax)

End of Ham-Space Digest V94 #108
****